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Alberta Government Action Plan on Climate Change

1998-99 Progress Report

October 29, 1999

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on
Climate Change

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Appendix I

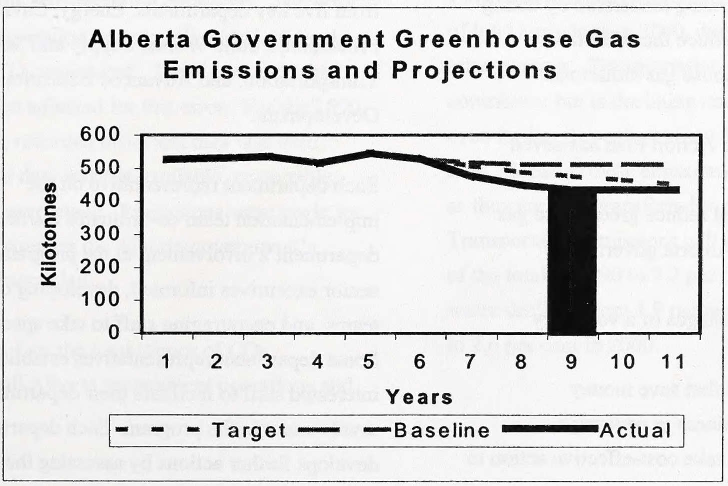
Executive Summary

The Government of Alberta submitted an Action Plan for Canada's Climate Change Voluntary Challenge and Registry Program in October 1995. The Action Plan focussed on measures that will directly result in reductions of greenhouse gas emissions from Alberta government operations over a three-year period.

The Government of Alberta submitted it's first Progress Report in October 1996. The Progress Report described the organisation established to deliver on the plan, the 1990 to 2000 baseline, a list of performance indicators, the target for the year 2000, and the cost-effective actions taken during the first year.

The overall target of the Government of Alberta is to reduce emissions by 14.1 per cent from 1990 levels by the year 2000.

This is the Government of Alberta's fourth annual Progress Report. This Progress Report describes the actions taken and the results from these efforts. In fiscal year 1998-99 total emissions of CO_2 equivalent from all government operations decreased from 449 kilotonnes to 435 kilotonnes of CO_2 equivalent, a 3.1 per cent reduction. These reductions exceed the target of 476 kilotonnes of CO_2 equivalent set for 1998-99.



The Government of Alberta continues to reduce its overall emissions and has consistently exceeded its annual targets. 1998 emissions of 435 kilotonnes of CO_2 equivalent are 17.3 per cent below 1990 levels. The reductions exceed our 1998 target by 41 kilotonnes. Our overall target for 2000 of 452 kilotonnes of CO_2 equivalent has also been exceeded by 17 kilotonnes of CO_2 equivalent.

In October, 1998 Premier Ralph Klein announced an Alberta strategy for action on climate change. The strategy reflects Alberta's continuing commitment to leadership in finding solutions to climate change. A key component of this strategy is government action to improve energy efficiency of Alberta government operations.

1.0 Background to Alberta's VCR Action Plan

1.1 Action Plan Objectives

The Government of Alberta submitted an Action Plan for Canada's Climate Change Voluntary Challenge and Registry Program in October 1995. The Action Plan focussed on measures that will directly result in reductions of greenhouse gas emissions from Alberta government operations over a three-year period. Greenhouse gas emissions related to Alberta government operations are mostly carbon dioxide. Emissions of methane, nitrous oxide and other greenhouse gases are less significant. The three major sources of carbon dioxide, in order of significance and their potential for reducing emissions are:

1) energy used in buildings, mostly natural gas and electricity,
2) waste,
3) operation of vehicles in the government's transportation fleet.

In 1990, emissions of carbon dioxide from Alberta government operations were 526 kilotonnes or about half a per cent of the province as a whole. The Alberta government is showing leadership by taking cost-effective actions to reduce the Alberta government's own greenhouse gas emissions.

The Alberta government's Action Plan has seven objectives:

- implement actions that reduce greenhouse gas emissions related to Alberta government operations
- demonstrate the advantages of a voluntary approach
- take effective actions that save money
- profit from doing business in new ways
- show how others can take cost-effective action to reduce emissions
- share what we learn
- measure and report on cost-effective quantitative actions.

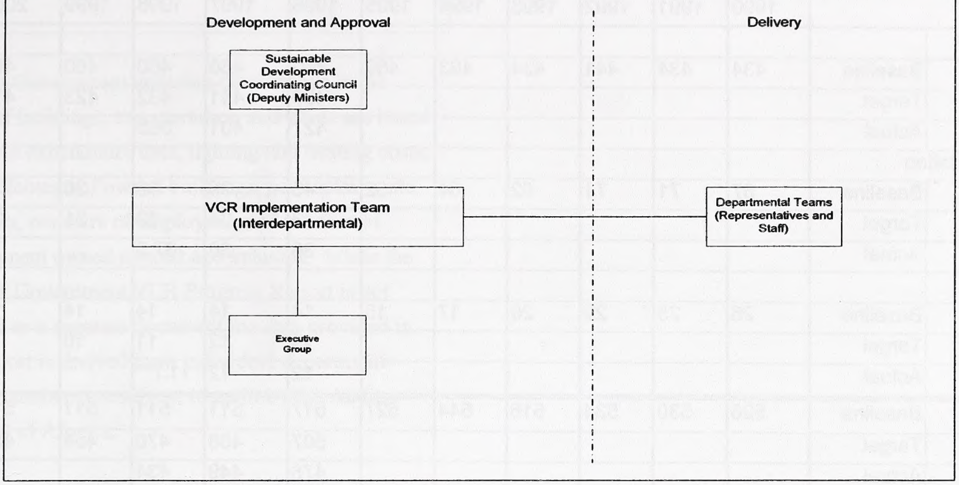
1.2 Cross Government Implementation

The Action Plan required an organizing mechanism to plan, develop, deliver, advise and assess greenhouse gas emission reducing actions (see Figure 1). An Implementation Team was established in December 1995 with representation from all government departments. This team reports to a committee of deputy ministers, the Sustainable Development Co-ordinating Council. The team provides overall co-ordination and direction for the Action Plan; ensuring integration of plans, actions and communication efforts.

Two years ago, an executive group was established to develop options to reduce greenhouse gases from the key emission sources and present them to the VCR team. Members of this group included representation from five key departments: Energy, Environmental Protection, Public Works, Supply and Services, Transportation, and Advanced Education and Career Development.

Each department representative on the implementation team co-ordinates his/her department's involvement in the program by keeping senior executives informed, developing departmental teams, and encouraging staff to take specific actions. Some department representatives established teams of interested staff to facilitate their department's involvement in the program. Each department then develops further actions by assessing the results from

Figure 1: Alberta Government VCR Management Structure


Development and Approval
Delivery
Sustainable Development Coordinating Council (Deputy Ministers)
VCR Implementation Team (Interdepartmental)
Departmental Teams (Representatives and Staff)
Executive Group

initial actions and investigating other potential actions.

1.3 Establishment of GHG Emission Baselines

A baseline was established for the period from 1990 to 2000 in the 1995-96 Progress Report. The baseline was adjusted in the 1996-97 report. The adjustment was necessary due to a spreadsheet error in calculating the transportation emissions. The error increased transportation and overall emissions by 4 kilotonnes of CO_2 equivalent. The figure and table below have been adjusted for this error. For the 1990 to 1995 period, recorded historical data was used. When historical data was not available, reasonable extrapolations were made. Projections were made for 1996 to 2000 based on the Alberta government's three-year business plan.

Table 1 summarizes the total tonnes of CO_2 equivalent for all Alberta government operations and for each emission source. Table 1 shows that emissions decreased to 517 kilotonnes of CO_2 in 1996 from 527 kilotonnes of CO_2 equivalent in 1990. Emissions are projected to decrease 2.9 per cent to 511 kilotonnes of CO_2 equivalent by the year 2000, from 526 kilotonnes in 1990.

The largest emission source is energy use in buildings. Buildings represented 82.5 per cent of the 1990 total and are projected to increase to 90 per cent of total emissions in 2000, due to reductions in the other sources. Transportation is the second largest contributor but is declining and predicted to decline even further through continued privatization of the fleet. Some of these emissions will not be eliminated as they are only transferred to the private sector. Transportation emissions will drop from 12.7 per cent of the total in 1990 to 7.2 per cent in 2000. Finally, waste declines from 4.9 per cent of emissions in 1990 to 2.6 per cent in 2000.

Table 1: Alberta Government Baseline, Targets, and Actual Figures for Greenhouse Gas Emissions.[1]

Emission Source		Kilotonnes of CO2 Equivalent										
		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Buildings												
	Baseline	434	434	441	434	463	460	460	460	460	460	460
	Target							450	441	432	423	414
	Actual							427	401	385		
Transportation												
	Baseline	67	71	71	62	64	52	43	36	36	36	36
	Target							43	34	33	31	29
	Actual							36	36	37.5		
Waste												
	Baseline	26	25	22	20	17	15	14	14	14	14	14
	Target							13	12	11	10	9
	Actual							12	12	11.7**		
Totals*	Baseline	526	530	534	516	544	527	517	511	511	511	511
	Target							507	488	476	464	452
	Actual							476	449	434		

*Columns may not add up due to rounding

**There is a one-year lag in the reporting of overall provincial waste reduction statistics. 1998/99 figures are estimates based on the 1997 per employee rates.

1.4 Performance Indicators

To measure the success of emission reduction actions taken, a series of performance indicators were chosen. The overall indicator for the action plan will be *the percentage of CO_2 equivalent of reduced emissions from Alberta government internal operations*. Two indicators have been chosen for each major emission source. For buildings, the indicators are *percentage reduction of CO_2 equivalent emissions and energy consumed per square meter per year*. For waste, the indicators are *percentage reduction of CO_2 equivalent emissions and waste disposal per employee per year*. For transportation, the indicators *are percentage reduction of CO_2 equivalent emissions and total amount spent on travel per employee per year*. The percentage reduction figures for each source will be added to calculate the overall action plan indicator.

1.5 Targets

Table 1 shows the emission reduction targets. Emissions will be 14.1 per cent less in 2000 than in 1990. Emissions are targeted to be 452 kilotonnes of CO_2 equivalent in 2000, a 74 kilotonnes reduction between 1990 and 2000. Targets have been established for each of the three emission sources. Based on these targets, an overall reduction target for the action plan was set.

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[1] Table 1 shows the target emission reductions, adjusted in the 1997-98 progress report to account for a spreadsheet error.

1.6 Verification of Results

Alberta Government emission calculations in the areas of buildings, transportation and waste are based on travel expenditure data, lighting and heating costs, square footage of owned buildings, per capita waste numbers, numbers of employees, and number of government owned aircraft and vehicles. While the Alberta Government VCR Progress Report is not audited as a separate document the data provided in this report is derived from individual departments whose numbers are subject to audit by the Auditor General of Alberta.

In addition, greenhouse gas emission reductions, energy consumption of buildings and waste reduction are key performance indicators for individual departments. These are published in department three year business plans and results are reported annually. The Auditor General performs an annual review of the performance measures of individual departments. This review examines the source of the data and any calculations that are made. It does not constitute a formal audit. No exceptions were reported in 1998/99.

2.0 Accomplishments

2.1 Summary of Past Progress Reports

The Government of Alberta submitted it's first Annual Progress Report in September 1996. The focus of the first year was to establish an organization to deliver on the plan, develop a baseline, choose indicators, set targets and begin to take action. These goals were accomplished.

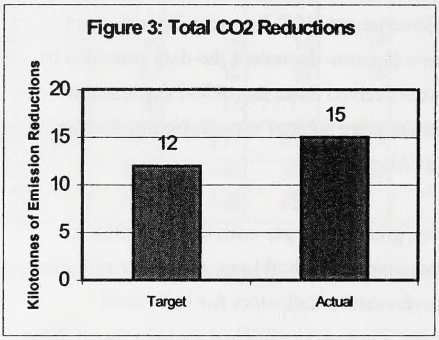
In September 1997, the Government of Alberta submitted it's second Annual Progress Report. Total emissions of CO_2 equivalent from all government operations decreased by 9.6% from 527 kilotonnes to 476 kilotonnes. This reduction exceeded the target of 507 kilotonnes of CO_2 equivalent.

In September 1998, the Government of Alberta submitted it's second Annual Progress Report. Total emissions of CO_2 equivalent from all government operations decreased by 5.7% from 476 kilotonnes to 449 kilotonnes. This reduction exceeded the target of 488 kilotonnes of CO_2 equivalent set for fiscal year 1997/98.

This report, submitted in October, 1999 is the Alberta government's fourth Annual Progress Report covering the fiscal year 1998/99.

2.2 Overall Results for Current Reporting Period 1998/99

Total emissions of CO_2 equivalent from all government operations decreased from 449 kilotonnes in 1997 to 434 kilotonnes of CO_2 equivalent in 1998, a 3.3 per cent reduction (see Figure 3). These reductions exceed the target of 476 kilotonnes of CO_2 equivalent set for 1998. Reduced emissions from buildings was the primary source of reductions in 1998-99. Buildings showed a decrease of 16 kilotonnes, waste showed a small reduction , while transportation increased by 1.3 kilotonnes.



Performance Measures - Overall

- **3.3 per cent reduction in CO_2 equivalent emissions**
- **Energy consumed per square metre increased from 1807 to 1845 megajoules**

2.3 Buildings

2.3.1 Buildings – Overall Results

Energy use was reduced in Alberta government buildings by 6.2 per cent during 1998. In 1998, savings principally resulted from a reduction in the total building space of 10 per cent. While the building energy performance index (BEPI) increased slightly from 1807 to 1845 megajoules per square meter in the past year, overall energy savings resulted in a reduction of 16.4 kilotonnes CO_2 equivalent or

4.1 %(see Figure 3). The energy savings were adjusted for temperature. The percentage of CO_2 equivalent was less than energy use saved because the largest energy savings were from natural gas, with lower emissions, versus electricity, which has higher related emissions.

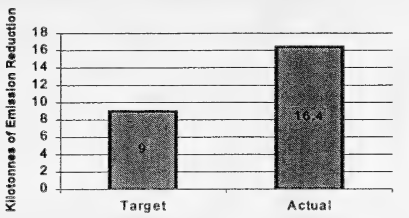


Figure 4: CO2 Reductions: Buildings

A Building Management Information System records energy use in all government buildings using data from gas and electric utility bills. Building managers use this information to track energy use in their buildings and to help identify opportunities for savings. The department of Public Works Supply and Services provides additional energy efficiency information to the managers and encourages energy efficiency operating practices.

Energy use savings resulted from energy performance contracts in specific buildings. Energy performance contracts were completed for the North West Group of Buildings. Savings from these buildings would be reflected in next year's reductions.

A program to audit all 342 government buildings over 1000 square meters and follow up with cost-effective retrofits is continuing. Retrofits are delivered through energy performance contracts and through capital and maintenance budgets.

Although it is difficult to assess, some reductions may have resulted from changes in staff habits. Department staff have been continually educated about measures to reduce greenhouse gases through newsletters, e-mail and posters. Prompts (labels with key messages) have been distributed throughout the government and placed on energy using equipment; such as light switches, computers, printers, and faxes. These encourage staff to shut off lights, printers and computers when not in use, and to use e-mail.

Performance Measures – Buildings

- **4.1 per cent reduction in CO_2 equivalent emissions**

2.3.2 Buildings -Specific Actions

- Construction has begun on retrofit projects for the four correctional institutes at the Spy Hill Complex in Calgary, six buildings at the Neil Crawford Centre and the Law Centre Group of four buildings in Edmonton. These projects will lead to significant savings in future years.
- Energy efficiency projects have been completed for the Alberta Vocational College, the Bowker Building, the Haultain Building, the Alberta Research Council, Millwoods and the Western Research Centre, Devon, the Lethbridge Building Group and the Northwest Buildings Group.
- Construction has commenced on the Water Re-circulation project at the Cold Lake Fish Hatchery and the Steam line Extension project at Government Centre in Edmonton, which will lead to the decommissioning of two steam plants when complete.
- An energy audit was conducted on the Legislature Building to identify energy saving measures. Those measures which are feasible and do not impact the historic nature of the building are to be implemented. These include lighting

retrofits, lighting and HVAC controls and new dampers.

- The provincial government is co-operating with Natural Resources Canada at the Devon Western Research Centre to install a micro-turbine.

2.4 Waste

2.4.1 Waste – Overall Results

Per capita waste disposal figures for 1998 are not currently available. There is a one-year lag in the reporting of overall provincial waste reduction statistics, on which government facility statistics are based. For the purposes of this report details on waste are reported for 1997/98.

Alberta government waste has declined from 7.0 kilotonnes in 1996 to 6.8 kilotonnes in 1997, a 3 per cent decrease. While the trend indicates an increase in waste being generated on a per capita basis, from 278 kilograms per employee per year in 1995 to 308 kilograms per employee per year in 1997, the overall decline is entirely due to reductions in numbers of government employees.

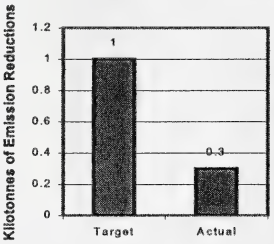
The target for waste disposal emissions for 1997 was to reduce to 12.2 from 13 kilotonnes of CO_2 equivalent. Since actual emissions were reduced from 12.6 kilotonnes to 12.2 kilotonnes of CO_2 equivalent, the target has been met.

Initiatives for this year were focussed on employee awareness. Posters with changeable inserts were used throughout government departments. The information on the posters is used to communicate messages such as increase recycling and reuse of paper, increase use of e-mail, and prompts to encourage staff to shut off lights, printers and computers when not in use.

Performance Measures - Waste

- **3 per cent overall reduction in CO2 equivalent emissions due to smaller workforce**
- **1998 figure for kilograms per employee per year not available**

Figure 5: CO2 Reductions: Waste



2.4.2 Waste - Specific Actions

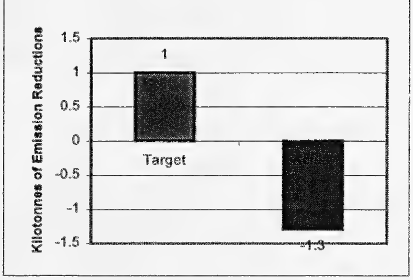
- Poster inserts were distributed through the various government departments to serve as reminders on paper waste, food waste, proper vehicle maintenance, and recycling.
- Two display units titled "Climate Change and You" have been developed to create/maintain an awareness of greenhouse gas issues. These are to be used in the foyers of various government buildings throughout the province.
- Computers for Schools program continues to promote the recycling of computers. Approximately 1000 computers from provincial government departments were provided in 1998-99. Over 12,000 computers have been distributed throughout Alberta since the Computers For Schools program began in 1993.

2.5 Transportation

2.5.1 Transportation – Overall Results

Alberta government employees use many forms of transportation. Transportation emissions come from the government fleet of light duty vehicles, government aircraft, and the use of employee's private vehicles and flying in commercial aircraft. Overall emissions from transportation increased from 36.2 kilotonnes of CO_2 equivalent to 37.5 kilotonnes of CO_2 equivalent. This increase was primarily attributable to the significant increases in aircraft time spent fighting forest fires 1998-99.

Figure 6: CO2 Reductions: Transportation



Light duty vehicles are estimated to have contributed 14.6 kilotonnes of CO_2 equivalent, down from 19.4 kilotonnes in 1996 and below the target of 15.5 kilotonnes of CO_2 equivalent.

Total mileage for Government owned aircraft significantly increased over the year. The majority of this increase was attributable to fighting forest fires. The summer of 1998-99 was very dry and Alberta experienced a large number of forest fires. A total of 1613 hours were flown fighting fires in Alberta, an increase of 318% over 1997-98. Fire fighting is an activity that helps reduce greenhouse gas emissions. Emissions from government aircraft were 2.9 kilotonnes [2] of CO_2 equivalent in 1997-98. Government aircraft emissions increased to 5.2 kilotonnes of CO_2 equivalent, a 79% increase over the year.

Government employees use their own personal vehicles for carrying out government business. Emissions from personal vehicles in 1997-98 were 5.73 kilotonnes of CO_2 equivalent. Personal vehicle travel decreased .02% to 5.72 kilotonnes of CO_2 equivalent in 1998-99.

Emissions from commercial aircraft used by government staff to attend meetings, trade shows, conferences and other business are tracked using the total dollars spent from travel expense forms and industry averages for fuel used. The actual emissions were 11.94 kilotonnes of CO_2 equivalent for 1998-99. When compared to the 10.78 kilotonnes recorded for the previous year, there was an increase of 10.8 per cent.

Performance Measures - Transportation
• **3.6 per cent increase in CO_2 equivalent emissions**
• **total dollars spent on personal vehicle and commercial aircraft increased 5.7%**

2.5.2 Transportation - Specific Actions

- Alberta Transportation and Utilities (AT&U) participated in a joint venture project that measured vehicle emissions on major thoroughfares in Calgary, Canmore, Edmonton and Red Deer over a two month period. Data collected was used to promote public awareness on their role in improving air quality.
- Sponsored and organized vehicle emission

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[2] 1997-98 emissions were incorrectly reported as 2.7 kilotonnes due to an error in calculation. This number should have been 2.9 kilotonnes

clinics for government employees during energy awareness week.

- AT&U supported the 1998 Solar Vehicle Project led by the University of Alberta.
- Conversion of Alberta's light duty fleet to leased vehicles continued in 1998/99. At year-end, approximately 29% of light duty vehicles were being leased.

3.0 - Supporting Activities

3.1 Provincial and National Processes

The Alberta government's Action Plan focuses on activities, which directly result in reduced emissions from government operations. However, many government activities influence others to reduce their emissions. These supporting activities contribute to the leadership role taken by the Alberta government in encouraging the reduction of greenhouse gas emissions throughout Alberta.

- ***Provincial Strategy on Climate Change:*** In October, 1998 Premier Ralph Klein announced an Alberta strategy for action on climate change. The strategy reflects Alberta's continuing commitment to leadership in finding solutions to climate change. A key building block of this strategy will be fostering partnerships with the public and industry. A copy of the strategy is included in Appendix 1.
- ***Provincial Climate Change Roundtable:*** In April of 1999 the Alberta government worked with the Alberta Economic Development Authority (AEDA) to hold a provincial Climate Change roundtable. Over 100 participants from industry, government, and various organizations and associations attended. The roundtable recommended actions to be undertaken on climate change in Alberta. One of the key recommendations was to establish a provincial co-ordinating body for climate change – Climate Change Central.
- ***Provincial Government Co-ordination:*** The Department of Energy, in concert with 11 other government departments, participates in an interdepartmental working group on climate change. This group ensures that climate change information and activities are disseminated throughout the government.
- ***National Climate Change Process:*** The Alberta government has taken a leadership role in the National Climate Change Process. Our involvement includes:
  - Honourable Gary Mar, Minister of Environment, is Co-chair of the Joint Energy and Environment Ministers forum
  - Co-chair National Air Issues Co-ordinating Committee – Climate Change (NAICC-CC)
  - Co-manager National Climate Change Secretariat
  - Membership on all but one Issue Table including co-chair of Enhanced Voluntary Table
  - Co-chair of National Air Issues Steering Committee (NAISC)
  - Participation on NAICC-CC sub-groups including co-chair of Monitoring and Reporting, Credit for Early Action Management Group, and Principles and Criteria Group.
- ***GERT:*** Alberta is a member of the voluntary baseline and credit, greenhouse gas emissions trading pilot (GERT), established to learn about the feasibility of emission reduction credit trading in Canada, and to encourage early emission reduction projects. The Alberta Government encourages Alberta energy companies to participate in the GERT pilot to strengthen their original commitment to the Voluntary Challenge and Registry Inc. and to

voluntary greenhouse gas emission reductions.

3.2 Climate Change Related Research

Some of the research projects being supported by the Alberta government in the area of greenhouse gases include:

- ***Improved Coal Combustion Research***: the Government of Alberta participates in an on-going project to evaluate the combustion, heat transfer and pollutant characteristics of coal combustion in an enriched oxygen medium with recycled CO_2 from flue gas. Research is aimed at providing a credible database for the development of more energy efficient fossil-fired power generation cycles, which can produce a purified stream of CO_2 for direct removal from a power plant.
- ***CO_2 Injection into Deep Alberta Coal Beds for the Production of Methane:*** current research is directed towards developing synergies with O_2/CO_2 recycling technology. For example, a coal-fired power plant would utilize the O_2/CO_2 combination furnace to produce a pure CO_2 flue gas that would be captured and used in the coal bed methane technology for the recovery of methane. This would result in a zero emission scenario.
- ***Reduced Volumes of Flare Gas***: in June 1998, the Clean Air Strategic Alliance (CASA) recommended to Alberta's Energy and Utilities Board (EUB) a 25% reduction on volumes flared by 2001 and stringent performance standards for the remaining flares in Alberta. CASA's recommendations were incorporated in the EUB's July, 1999 Flaring Guide. A 25% reduction in flaring volumes would reduce CO2 emissions by an estimated 1.25 megatonnes of CO2 - a 0.7% decrease in Alberta emissions.
- ***Combustion Efficiency of Flares:*** Alberta Government departments are participating in research relating to the measurement of combustion efficiency related to flares. Further research is aimed at supporting alternative technologies for the handling of flare gas streams.
- ***Removal of Barriers to the Use of Otherwise Flared Solution Gas:*** The Department of Energy and the EUB, together with stakeholders, have taken actions to facilitate electricity generation from solution gas that would otherwise have been flared. Key priorities have been the creation of a royalty waiver program removing barriers to electricity generation using solution gas that otherwise would be flared (e.g. exempting otherwise flared solution gas from the Electric Utilities Act).
- ***CO_2 Synergies Initiative:*** the Government of Alberta participates on this initiative. Lead by the Alberta Chamber of Resources, it is focused on developing commercial uses for CO_2 through research and development projects. A broad range of industry and government stakeholders participate in this initiative.
- ***Reclamation Research***: Programs established by Syncrude and Suncor in co-operation with the government of Alberta are continuing with a focus on reclamation research. The program is also working on a greenhouse gas offset strategy using fast growing tree plantations. These plantations can serve to sequester atmospheric CO_2 in the short, medium, and long terms.
- ***The Alberta Agricultural Research Institute:*** funds a variety of agricultural research programs with an annual budget of about $12.5 million. A number of the research studies funded may have GHG benefits.
- ***Prairie Soil Carbon Balance Research Study:*** Alberta is one of a number of partners supporting

a multi-year research study to better understand soil carbon dynamics. The purpose of the study is to develop scientifically sound methods to assess changes in soil carbon based on management practices.

- ***Calgary Landfill Design Project:*** Alberta Environment is a partner with the City of Calgary and the University of Calgary in a project to study landfill designs for the control of landfill gas emissions (including methane). The $50,000 project involves the building of two experimental landfill cells for studying lining/capping materials for landfills.
- ***Geological Sequestration of CO2:*** This project, jointly funded by the Government of Alberta and the federal government under the Western Economic Partnership Agreement (WEPA), is assessing the suitability of Alberta's subsurface for CO2 sequestration in one of the following ways:
  - use in enhanced oil recovery,
  - use in enhanced coal bed methane recovery,
  - storage in depleted oil and gas reservoirs,
  - injection and sequestration in deep saline formations, and
  - storage in salt caverns.
- ***Alberta's Livestock Sector Study:*** Alberta commissioned a study to assess the potential effects of expanding Alberta's livestock sector on air quality. The study looks at five potential growth scenarios. The study will make recommendations on management and facility development to mitigate environmental impacts.
- ***Research on the Role of Forests in the Global Carbon Cycle: The*** Government of Alberta funds the Foothills Model Forest and the Sustainable Forest Management Network to a combined total of $2 million per annum. A portion of this funding supports research into the carbon dynamics of forests and other landscapes of the boreal forest. The Foothills Model Forest has compared the impact of wildfire disturbance and wood products manufacture on the sequestering of carbon. In the last two years, the Network investigated the size and dynamics of some of Alberta's large carbon pools, such as peatlands. During the next few years, the Network plans to investigate the accuracy of measurement of carbon fluxes in Alberta's forest landscapes.
- ***International Energy Agency Greenhouse Gas Research & Development Programme:*** The Alberta government has provided on-going support toward the base-operating component of this International Research Initiative. Several reports are available on a variety of International projects relating to GHG reduction and technology utilization.

3.3 Electricity Restructuring and Power Generation

Electricity deregulation and restructuring has removed one of the major roadblocks to renewable generation. Alberta's "open-access" power pool and non-discriminatory system access is provided to all sources of generation by the independent Power Pool of Alberta and the independent Transmission Administrator. This allows renewable energy to compete with all other generation sources in the generation market. Open access has also meant that higher efficiency, lower greenhouse gas emitting technologies, such as natural gas-fired combined cycle and cogeneration units, can now more effectively enter and compete in the new generation market. Most of the next 1500 megawatts of new generation in Alberta will likely come from natural gas-fired cogeneration plants which provide both process steam and electricity from the same unit, resulting in energy conversion efficiencies of 65-95%. In 1998/99:

- Two new cogeneration plants were completed with a total capacity of 91 megawatts. Over 600 megawatts of new cogeneration plants are under construction.
- Four new wind turbines have been commissioned and are producing power.

➢ ***Development of Renewable Power Generation Technologies:*** the Government of Alberta has provided significant support for the development of renewable power generation technologies. The Small Power Research and Development Act (SPR&D) of 1988, resulted in 18 renewable energy projects in Alberta, including two of the largest operating wind farms in Canada. In 1998, over 500 gigawatt hours (Gwh) of electricity was generated under this program. Assuming all power produced will offset an equal amount of fossil generation, this program represents a potential offset of approximately 0.4 MT (megatonnes) of CO_2.

➢ ***Hydro Power Generation:*** The Alberta Government awarded two contracts to install and operate hydro power generation at Oldman Dam and Taylor Coulee Chute. Oldman Dam will generate 25.0 MW to be completed in 2nd Qtr 2002 and Taylor Coulee Chute will generate 12.5 MW to be completed 2nd Qtr 2000.

➢ ***Clean Air Strategic Alliance (CASA):*** The Alberta Clean Air Strategic Alliance Board established a multi-stakeholder Climate Change Project Team in June 1998. In December 1998, the team and Alberta Resource Development sponsored a "Workshop on Demand Management and Conservation in Alberta's Electricity Industry". The team is currently examining barriers to action on climate change and is developing an outreach pilot aimed at Alberta communities.

3.4 Recycling

Alberta Environment is a funding partner in the development of the ***Post-Consumer Plastic Recycling Strategy***. The strategy is being developed by a multi-stakeholder group with representatives from the three levels of government, resin manufacturers, environmental and industry groups to help create a sustainable post-consumer plastics recycling and recovery industry within Alberta.

3.5 Air Quality

➢ ***Air Quality Monitoring:*** In 1998, Alberta Environment monitored air quality continuously in Edmonton (3 stations), Calgary (3 stations), Fort Saskatchewan, and Beaverlodge. The Wood Buffalo Environmental Association operated the Fort McMurray and Fort McKay monitoring stations. The air quality parameters monitored include carbon monoxide, dust and smoke, nitrogen oxides, ozone, total hydrocarbons, hydrogen sulphide, sulphur dioxide, carbon dioxide, ammonia, and particulates. The Index of the Quality of the Air (IQUA) was calculated at Edmonton, Calgary, Fort Saskatchewan, and Fort McMurray stations. The concentrations are converted into air quality ratings of *Good, Fair, Poor, and Very Poor.*

- In 1998, good air quality was reported from 95 to 99% of the time at all monitoring stations
- Poor air quality occurred for a combined total of 11 hours at all stations
- Very poor air quality was not reported in 1998

3.6 Education, Training and Awareness

The Alberta government continues to improve education and awareness about climate change. Initiatives are aimed at government employees, general public, communities, other levels of government and industry. Some of the initiatives supported by the Alberta government include:

3.6.1 Government Employee Awareness

- ***CO2 Diet Program:*** Alberta Environment, Environment Canada, and Alberta Energy joined forces to pilot the CO2 Diet program in their departments. The aim of the program is to create awareness of climate change issues and their impact on our environment. Ten one-hour information sessions on different climate change issues were delivered to department audiences.
- ***Staff Awareness:*** Government staff are continually educated about measures to reduce greenhouse gases through newsletters, e-mail and posters. Prompts (labels with key messages) continue to be distributed throughout the government and placed on energy using equipment; such as light switches and computers to encourage staff to shut off lights, and computers when not in use, and to use e-mail, printers, and faxes. Vehicle emission clinics were organized for government employees during energy awareness week.

3.6.2 Public Education

- ***School Curriculum:*** the topics of greenhouse gases and climate change continue to be addressed in compulsory social studies courses (grades 8 and 11) and in the secondary science courses (grades 7 to 12). As well, students learn about the greenhouse effect in the grade 5-science course that was introduced in 1996. Related topics also are included in optional courses such as environmental and outdoor education (Grades 7-9) and in the natural resources and wildlife strands of Career and Technology Studies.
  Current revisions to the ***secondary science program*** will provide increased emphasis on environmental studies at all grade levels (7 to 12), with particular emphasis on environmental change. Implementation of the revised science programs will begin in September 2001
- ***Climate Change Teacher Workshops:*** Alberta Environment is a partner with the Friends of the Environment Society (FEESA), and Destination Conservation in the national education initiative, Climate Changes, developing educational resources on global climate change. These will be delivered through professional development workshops to science and social studies teachers in the Destination Conservation network and other education networks across Canada.
- ***School Information Materials:*** Information materials aimed at awareness of climate change and related issues have been developed for the school curriculum in co-operation with community groups such as SEEDS (Society, Environment and Energy Development Studies), FEESA and Destination Conservation.
- ***Environmental Exhibits:*** Alberta Community Development ran the Earthquest exhibition at the Provincial Museum of Alberta from January to May 1998. It was sponsored by EPCOR and FORD of CANADA, and, in addition to environmental themes, discussed fuel efficient and alternative fuel cars. The messages of reduce, reuse, and recycle were everywhere

throughout the exhibition. It was a popular show that attracted children and school groups.

- ***Public Awareness:*** Alberta Transportation and Utilities participated in a joint venture project that measured vehicle emissions on major thoroughfares in Calgary, Canmore, Edmonton and Red Deer over a two month period. Data collected was used to promote public awareness on their role in improving air quality.

3.6.3 Communities and Municipalities

- ***Sustainable Communities:*** Alberta Environment along with FEESA are working to help Alberta communities achieve their vision of sustainability through the Sustainable Communities Initiative (SCI). This initiative supports local communities through participation, public education and communication. In 1998 this program continued to help communities develop and implement action plans on waste, green spaces, transportation, sustainable housing and other grassroots efforts.
- ***Energy Efficient Municipalities:*** The Alberta Eco-Efficient Communities Initiative (EECI) was developed through Alberta's Clean Air Strategic Alliance (CASA) to help municipalities address the issue of global climate change. The EECI helps municipalities improve the eco-efficiency of their own operations and the community as a whole. The primary targets are small and medium-sized communities in Alberta, which often do not have the in-house staff and resources for independent energy efficiency exploration.

3.6.4 Farm Management Practices

- ***Alberta Environmentally Sustainable Agriculture (AESA) Program:*** The AESA Program, created in July 1997, aims to amplify the industry's efforts to improve environmental stewardship. The program has four components: Farm Based, Processing Based, Resource Monitoring, and Research. It has encouraged research and adoption of reduced tillage and other management practices that have reduced fuel use and increased soil carbon storage. The program budget is $5 million per year.
- ***Alberta Reduced Tillage Initiative (ARTI):*** Alberta participates and provides funding to a partnership of government, agri-business, producer associations and wildlife associations which promotes the benefits of reducing the amount and intensity of tillage. The GHG benefit is reduced fuel use and increased carbon storage in soil, which helps to reduce net GHG emissions.
- ***Farm Business Management Program:*** Alberta delivers the Farm Business Management Program, which focuses on improving financial and other business management skills. Production (nutrient) management is one component of the program that can provide GHG reduction benefits.

4.0 VCR Workplan for 1999-2000

Current targets for year 2000 have been exceeded for the second year in a row. The Alberta Government will undertake to set post-2000 targets for its VCR program in fiscal year 1999-2000. Current commitments to action identified for 1999/2000 include:

- Continue with the current program to audit all 342 government buildings over 1000 square meters and follow up with cost-effective retrofits will. Retrofits will be delivered through energy performance contracts and through capital and maintenance budgets.
- Three groups of buildings are planned to receive major retrofits in the next year. The buildings are: Red Deer and Area Buildings Group (audit underway); North Central Buildings Group; a group of buildings in southern Alberta.
- The Terrace Building Computer Center closed in 1998/99. A central plant provided chilled water year round to support the computer cemtre and some minor cooling at the Legislature. The central chilled water plant is to be shut down this winter and a free cooling system will be instituted for the Legislature.
- Lighting retrofits, lighting and HVAC controls and new dampers will be undertaken on the Legislature Building as a result of the energy audit conducted in 1998/99.
- Building managers will continue to use the Energy Consumption Recording System to compare their consumption with other buildings and take operating and maintenance actions if warranted.
- Two pilot projects will be undertaken to partner energy efficiency improvements with private sector owners of buildings leased by the government.
- Building managers will continue to use the Energy Consumption Recording System to compare their consumption with other buildings and take operating and maintenance actions if warranted.
- Alberta Agriculture will complete a study of ethanol as an alternative fuel as part of a broader department policy review.
- 'Run of the river' hydropower generation retrofits at Taylor Coulee Chute and the Oldman Dam to be completed in 2nd Qtr 2000 and 2nd Qtr 2002 respectively.
- Continuation of the CO2 Diet program for government staff. Future activities being explored include the use of a 'Climate Change Calculator'. This is a software tool to assist government employees in tracking their individual or group impact on greenhouse gas emissions.
- The provincial departments of Energy, Economic Development and Environment, and Industry Canada, are working to develop an Alberta strategy to promote the use of Joint Implementation (JI) and Clean Development Mechanisms (CDM) under the Kyoto Protocol. Main activities will include expanding contacts with companies and with Canada's foreign posts, developing information materials on country positions and funding sources, and developing workshops/seminars concentrating on JI/CDM opportunities.
- The Government of Alberta and stakeholders will complete an *Alberta Technology Strategy for the Management of Greenhouse Gas Emissions*:

  - to ensure the effective deployment of technologies, and
  - to capitalize on global opportunities for exporting climate-friendly technology solutions developed and adapted in Alberta.

- Establishment of Climate Change Central as a public/private sector partnership to facilitate action on climate change across all sectors, including government.
- Continued involvement in the GERT pilot.
- Implementation of the Post-Consumer Plastic Recycling Strategy with the creation of a province wide plastic milk container collection system.
- Current waste reduction programs will continue.

5.0 Conclusion

The Alberta Government is taking leadership by reducing it's own greenhouse gas emissions. A target of 14.1 per cent reduction (74 kilotonnes CO_2 equivalent) from 1990 levels by the year 2000 has been established. Actions have been taken to meet this target.

In 1998, total emissions of CO_2 equivalent from all government operations decreased from 449 kilotonnes in 1997 to 435 kilotonnes of CO_2 equivalent in 1998, a 3.1 per cent reduction. These reductions exceed the target of 476 kilotonnes of CO_2 equivalent set for 1998.

The 1998 emissions of 435 kilotonnes of CO_2 equivalent are 17.3 per cent below 1990 levels. The reductions exceed our 1998 target and our overall target for 2000 of 452 kilotonnes of CO_2 equivalent by 17 kilotonnes of CO_2 equivalent. This is the second year in a row that Alberta has exceeded its targets for GHG reductions.

In summary, the targets set for 1998 have been surpassed, although some of these emissions have probably been transferred to the private sector. Greenhouse gas emissions have gone down 14 kilotonnes through energy efficiency initiatives, employee education programs and downsizing of government. A cross-government team is implementing actions with support from senior executives. A baseline has been established, performance measures chosen, and targets set. Actions are showing results and these results will continue to be monitored, assessed and reported on in future progress reports. Targets will be revised and updated.

Alberta is committed to finding solutions to climate change and is taking a leadership role in the development of climate change responses both at the provincial and national levels.

Appendix I

Government of Alberta News Release

Thursday, October 15, 1998

Alberta releases strategy for action on climate change

Edmonton... Scientific research and development, action by industry and government to reduce emissions, and the establishment of a private-public sector partnership to engage Albertans in discussion and action on climate change are among the key elements of the Alberta government's strategy for action, released today by Guy Boutilier, chair of the Cabinet Committee on climate change. Premier Ralph Klein established the cabinet committee in February 1998 to develop the Alberta government's position in the wake of the Kyoto conference.

"Our committee consulted with municipal leaders, academics, industry and environmental stakeholders in developing this strategy," said Boutilier (MLA - Fort McMurray). "Cabinet has accepted our committee's recommendations and these will now form the basis of our official government position on climate change. Energy Minister Steve West and Environmental Protection Minister Ty Lund will be taking this position forward at the joint ministers meeting on climate change in Halifax October 19-20."

The members of the Cabinet Committee on Climate Change are: Guy Boutilier (chair), Energy Minister Steve West, Environmental Protection Minister Ty Lund, Justice Minister Jon Havelock, Intergovernmental Affairs Minister David Hancock, and Science and Research Minister Lorne Taylor.

Attachments: Alberta's Strategy for Action on climate change; Alberta government position statement on climate change.

For more information:

Guy Boutilier - Chair, Cabinet Committee on Climate Change - (403) 415-0987

Alberta's Strategy for Action on Climate Change - Preliminary Report

Earlier this year Premier Ralph Klein established the cabinet committee on climate change to consult with stakeholders and get back to Cabinet with a recommendation on the government's position in the wake of the Kyoto conference. The committee consulted with municipal leaders, academics, environmentalists, and industry. The committee also consulted with the Alberta Economic Development Authority (AEDA) which, in turn, consulted with its stakeholders. Following is the committee's preliminary report on the guidelines for a made-in-Alberta response to the global issue of climate change and a draft statement outlining Alberta's position on climate change.

Risk

The committee agrees with the assessment that the risk of greenhouse gas emissions contributing to climate change warrants **precautionary measures** - which would mean incurring prudent costs to achieve best efforts in reducing the growth in emissions.

Principles

In light of the above risk assessment, the committee recommends that the Alberta government strategy incorporate the following principles:

1. The Prime Minister should be held to his commitment to Premiers to ensure equitable treatment across Canada, without placing undue burden on Canadians in a particular province or region. No inter-regional or cross-sectoral wealth transfers should result. We should continue to ask the federal government to research

the impact on Alberta of reducing greenhouse gas emissions to the levels cited in the Kyoto Accord.

2. Alberta should renew its commitment to best efforts in reducing emissions.
3. We must include energy consumers in our strategy because energy consumption is responsible for a large percentage of increases in emissions.
4. The long-term solution will be based on innovation and technology.
5. Competitiveness of all sectors and the economy as a whole must be maintained or enhanced.
6. Responses must be cost-effective and justifiable in the context of Alberta's and Canada's competitive position.
7. Excessive penalties on existing business and personal investments must be avoided by giving adequate lead-time and gradual implementation.

Recommendations

The committee believes the government should form a partnership with Albertans to establish a policy and take actions to improve energy productivity.
Alberta's response to the climate change challenge should be based on the province's needs and circumstances in the national and global context, and should maintain its commitment to People, Prosperity and Preservation. Alberta should continue to be a world leader in promoting the wise use of energy resources (the **Environmental Energy Advantage**).

The Alberta government should announce a multi-pronged action plan to promote the Environmental Energy Advantage. A process to engage Albertans should follow.

Alberta's Action Plan

The committee recommends that the Alberta government promote and develop the Environmental Energy Advantage with a commitment to support the following elements:

- **Scientific and technological research:** In conjunction with industry and universities, research ways to improve energy use in areas such as residential and commercial buildings, transportation, agricultural and industrial processes, biotechnology, engineering, and environmental sciences. Consolidate Alberta government research and development efforts.
- **Business and individual action to improve energy productivity:** Encourage individual Albertans and industries to adopt energy efficient practices through measures such as Destination Conservation's School Energy Upgrade Program, joint research and development ventures, standards, emissions trading and technology transfers.
- **Government action to improve energy productivity:** Improve the energy efficiency of Alberta government operations through energy audits of government buildings, appliances and vehicles and energy productivity targets for departments.
- **Economic analysis:** Analyze and participate in research examining issues such as multi-sectoral economic impacts and initiatives underway in other countries.
- **Communications plan:** Work with the private sector to develop a major national and international communications plan to promote the Environmental Energy Advantage, emphasizing best practices to improve energy productivity.
- **Climate Change Central:** Establish a government/private sector partnership to engage Albertans in public discussion and education re: climate change and energy efficiency.

STATEMENT OF ALBERTA'S POSITION ON CLIMATE CHANGE

Alberta's record

Albertans want and enjoy clean air and water. Alberta prides itself in these areas, leading the country in our actions to protect the environment, from the Environmental Protection and Enhancement Act … to the Clean Air Strategy … to the Voluntary Challenges Registry Program.

When it comes to greenhouse gas emissions, Alberta has always believed in the cautionary principle of taking prudent actions to minimize our impact on the environment. Alberta has always believed in doing our best to reduce greenhouse gases. That's why we are leading all other Canadian provinces in our efforts to reduce emissions. Alberta was ahead of the game when it signed on to the Voluntary Challenges Registry Program. Our government is well ahead of its own 14 per cent emission reduction target, making us the best government in the country, and the third best organization overall in terms of reducing emissions. We have already reduced emissions by 10 per cent.

A fair solution for Albertans

We have heard talk about the national strategy for climate change. Let's not forget that Alberta players - Alberta's industry and environmental leaders - are key players in the national effort. Albertans have always been first to the plate when it comes to important national issues like this. And Alberta has been participating fully in the federal government tables on climate change.

Albertans and Alberta industry are committed to a solution - one that considers all provinces, all countries, all sectors as part of the solution. We must continue to hold the Prime Minister to his word when he told Premiers last year that there would be an equitable approach to a Canada-wide solution, one that does not place an unfair burden on one province or area.

The provinces and the people who live in the provinces play a key role in implementing greenhouse gas reduction strategies. Provinces need a role in developing an equitable and fair solution. A poorly designed solution could result in profound and unwarranted economic impacts on Canadians.

Alberta's Strategy

Alberta is committed to a long-term solution. We are committed to supporting technology and innovation in this province. We are committed to studying greenhouse gas emissions.
We are committed to helping businesses, individuals and governments take action to reduce emissions. We are committed to sustainable development. We are committed to educating the public.
Over the months to come, we will determine what resources are needed and how we can contribute to the Environmental Energy Advantage in this province. We want to continue to develop this strategy the way we always have - with our partners in Alberta.

We want to continue to be leaders and forge new ground in this area. By being on the leading edge, we can play a role in helping other provinces and other countries utilize the new technologies. We know there are many areas of the world which still use outdated technology. Although Alberta produces energy to meet world demand, we do not consume as much as many other jurisdictions. There may also be a role for Alberta to play in promoting better consumption practices around the world.

It's not a matter of a quick fix … or an arbitrary target level. It's a matter of changing the way we view the environment in our homes and in our workplaces. Sustainable development is not simply a program but a way of life.

Alberta is not going to wait for action on the federal front. We are acting now.

We realize that global climate change is a real and serious issue - we are committed to cooperative action. We are committed to finding a solution. And over the coming months our government will be building partnerships. We will engage Albertans in promoting and developing best practices as well as educating the public and industry

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